

<b>Notice of Allowability</b>	Application No.	Applicant(s)	
	10/077,064	LI ET AL.	
	Examiner Christopher R. Magee	Art Unit 2653	

— The MAILING DATE of this communication appears on the cover sheet with the correspondence address—

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1.  This communication is responsive to response filed on 4/8/2005.
2.  The allowed claim(s) is/are 45-64.
3.  The drawings filed on 15 February 2002 and 11 June 2002 are accepted by the Examiner.
4.  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a)  All
  - b)  Some\*
  - c)  None
 of the:
  1.  Certified copies of the priority documents have been received.
  2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3.  Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5.  A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6.  CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
  - (a)  including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
    - 1)  hereto or 2)  to Paper No./Mail Date \_\_\_\_\_.
  - (b)  including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7.  DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

#### Attachment(s)

1.  Notice of References Cited (PTO-892)
2.  Notice of Draftperson's Patent Drawing Review (PTO-948)
3.  Information Disclosure Statements (PTO-1449 or PTO/SB/08),  
Paper No./Mail Date 4/15/2002
4.  Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
5.  Notice of Informal Patent Application (PTO-152)
6.  Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_.
7.  Examiner's Amendment/Comment
8.  Examiner's Statement of Reasons for Allowance
9.  Other \_\_\_\_\_.

## DETAILED ACTION

### *Examiner's Amendment*

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Stephen B. Ackerman on Tuesday, August 02, 2005.

The application has been amended as follows: Cancel claims 1-44.

### *Reasons for Allowance*

2. Claims 45-64 are allowed (renumbered as 1-20, respectively).

The following is an examiner's statement of reasons for allowance:

This application is for a SYNTHETIC PATTERN EXCHANGE CONFIGURATION FOR SIDE READING REDUCTION.

- **Claim 45** specifies a method for fabricating a synthetic, patterned, longitudinally exchange biased GMR sensor with narrow effective trackwidth, which requires:

*"forming a ferromagnetic, longitudinal biasing layer of thickness F2, and magnetic moment  $M_{F2}$  on said coupling layer, producing thereby a coupling energy,  $J_s$ , and an exchange energy,  $J_{ex}$ , and wherein the thicknesses F1 and F2 will be determined so that a ratio of the respective magnetic moments  $M_{F2}/M_{F1}$  satisfy a relationship  $M_{F2}/M_{F1} = (J_s + J_{ex}) / J_s$ ;"*

Gill (US 5,920,446) teaches a ratio of a first ferromagnetic layer thickness to a second ferromagnetic layer thickness that yields magnetic moment ratios  $M_{11}/M_{12}$  and  $M_{21}/M_{22}$  in the approximate range from 1/1 to 3/1 [col. 9, lines 14-18]. The net magnetic moments indicated in Gill are from the free layer structures [410 and 420]. Gill does not disclose, teach or suggest a ferromagnetic, longitudinal biasing layer of thickness  $F_2$ , and magnetic moment  $M_{F2}$  on said coupling layer, producing thereby a coupling energy,  $J_s$ , and an exchange energy,  $J_{ex}$ , and wherein the thicknesses  $F_1$  and  $F_2$  will be determined so that a ratio of the respective magnetic moments  $M_{F2}/M_{F1}$  satisfy a relationship  $M_{F2}/M_{F1} = (J_s + J_{ex}) / J_s$ , as claimed in the present invention.

Therefore, these features, in combination with other features of claim 45, are not anticipated by, nor made obvious over, the closest prior art of record of Gill (US 5,920,446).

- **Claim 57** specifies a method for fabricating a synthetic, patterned, longitudinally exchange biased GMR sensor with narrow effective trackwidth, which requires:

*“forming a ferromagnetic, longitudinal biasing layer of thickness  $F_2$ , and magnetic moment  $M_{F2}$  on said coupling layer, producing thereby a coupling energy,  $J_s$ , and wherein the thicknesses  $F_1$  and  $F_2$  will be determined so that a ratio of the respective magnetic moments  $M_{F2}/M_{F1}$  satisfy a relationship  $M_{F2}/M_{F1} = 1$ ;”*

Gill (US 5,920,446) teaches a ratio of a first ferromagnetic layer thickness to a second ferromagnetic layer thickness that yields magnetic moment ratios  $M_{11}/M_{12}$  and  $M_{21}/M_{22}$  in the approximate range from 1/1 to 3/1 [col. 9, lines 14-18]. The net magnetic moments indicated in Gill are from the free layer structures [410 and 420]. Gill does not disclose, teach or suggest a longitudinal biasing layer of thickness  $F_2$ , and magnetic moment  $M_{F2}$  on said coupling layer, producing thereby a coupling energy,  $J_s$ , and wherein the thicknesses  $F_1$  and  $F_2$  will be

determined so that a ratio of the respective magnetic moments  $M_{F2}/M_{F1}$  satisfy a relationship  $M_{F2}/M_{F1} = 1$ , as claimed in the present invention.

Therefore, these features, in combination with other features of claim 57, are not anticipated by, nor made obvious over, the closest prior art of record.

3. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

*Conclusion*

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher R. Magee whose telephone number is (571) 272-7592. The examiner can normally be reached on M-F, 8: 00 am-5: 30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Korzuch can be reached on (571) 272-7589. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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August 2, 2005  
crm



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